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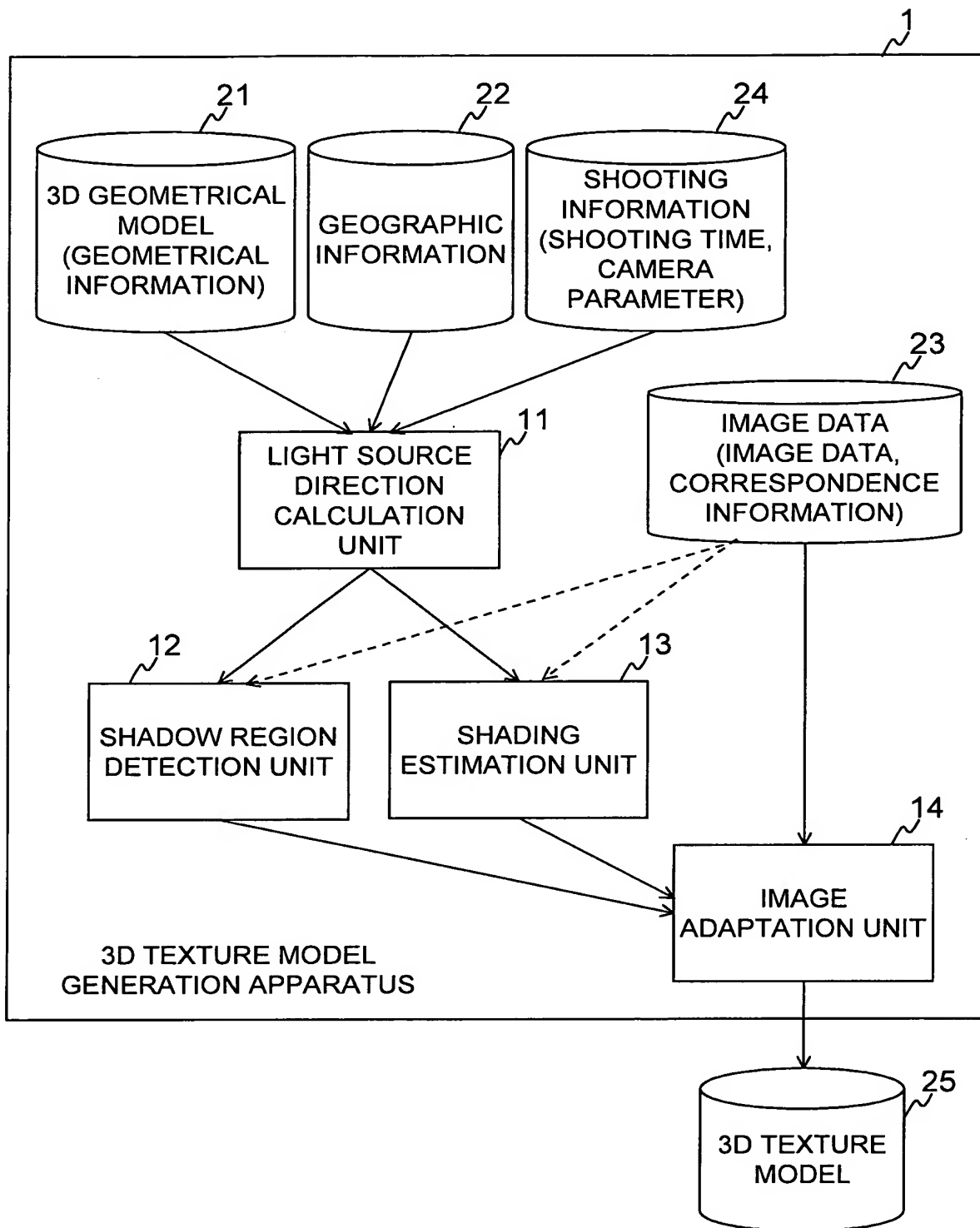


FIG.1

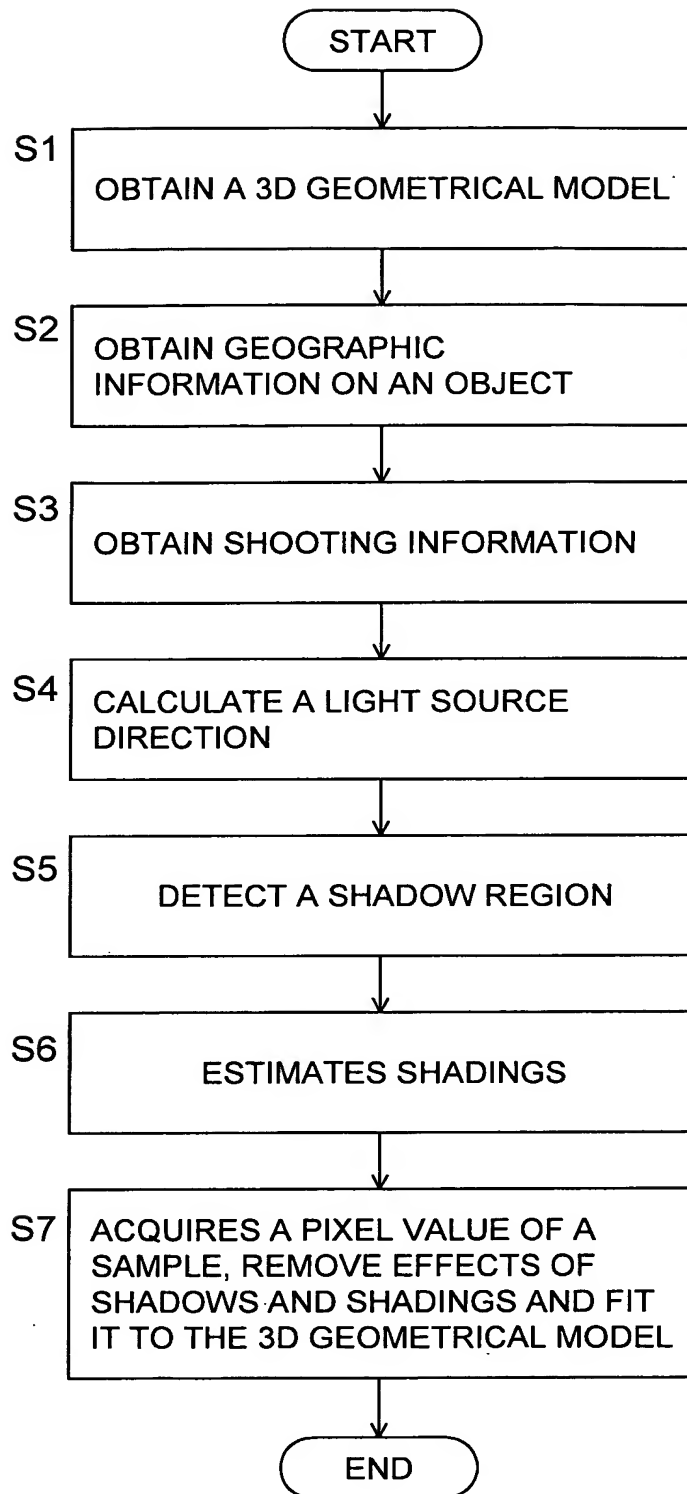


FIG.2

$$\begin{aligned}
\theta_d &= 2\pi d / D_y, \\
\theta_t &= 2\pi t / T - \theta_{long}, \\
A &= \sqrt{\cos^2 \theta_d \cos^2(\theta_{axis}) + \sin^2 \theta_d}, \\
B &= |\cos^2 \theta_d \sin^2 \theta_{axis}| \\
C &= -A \cos \theta_t \\
s_x &= A \sin \theta_t \\
s_y &= YB \cos \theta_{lat} - C \sin \theta_{lat} \\
s_z &= B \sin \theta_{lat} + C \cos \theta_{lat} \tag{1}
\end{aligned}$$

FIG.3

$$\alpha = \max(\cos^{-1}(l \cdot n), \cos^{-1}(v \cdot n))$$

$$\beta = \min(\cos^{-1}(l \cdot n), \cos^{-1}(v \cdot n))$$

$$v_{\perp} = v - n(n \cdot v)$$

$$l_{\perp} = l - n(n \cdot l)$$

$$\Delta_{\perp} = \begin{cases} 1 & \text{if } \|v_{\perp}\| \|l_{\perp}\| = 0 \\ \frac{(v_{\perp} \cdot l_{\perp})}{\|v_{\perp}\| \|l_{\perp}\|} & \text{otherwise} \end{cases}$$

$$C_1 = 1 - \frac{\sigma^2}{2(\sigma^2 + 0.33)}$$

$$C_2 = \begin{cases} \frac{0.45\sigma^2}{\sigma^2 + 0.09} \sin \alpha & \text{if } \Delta_{\perp} \geq 0 \\ \frac{0.45\sigma^2}{\sigma^2 + 0.09} \left(\sin \alpha - \left(\frac{2\beta}{\pi} \right)^3 \right) & \text{otherwise} \end{cases}$$

$$C_3 = \frac{0.125\sigma^2}{\sigma^2 + 0.09} \left(\frac{4\alpha\beta}{\pi^2} \right)^2$$

$$f_1 = \frac{\rho}{\pi} \left[C_1 + C_2 \Delta_{\perp} \tan \beta + \left\{ \left(1 - \left| \Delta_{\perp} C_3 \tan \left(\frac{\alpha + \beta}{2} \right) \right| \right) \right\} \right]$$

$$f_2 = \frac{0.17\rho^2}{\pi} \left[\frac{\sigma^2}{\sigma^2 + 0.13} \left\{ 1 - \Delta_{\perp} \left(\frac{2\beta}{\pi} \right) \right\} \right]$$

$$f(\sigma, \rho) = f_1(\sigma, \rho) + f_2(\sigma, \rho)$$

(2)

FIG.4

$$I^c(p) = M^c(p) L_d^c \{ K^\#(p, \sigma, \rho) + K_e^c \} \\ B_d^c(p) \{ K^\#(p, \sigma, \rho) + K_e^c \} \quad (4)$$

where

$$K^\#(p, \sigma, \rho) = \begin{cases} 0 & \text{if } p \in R_s \vee (l \cdot n(p)) < 0 \\ R(l, v(p), n(p), \sigma, \rho)(l \cdot n(p)) & \\ \text{otherwise} \end{cases} \quad (5)$$

FIG.5



FIG.6



FIG.7

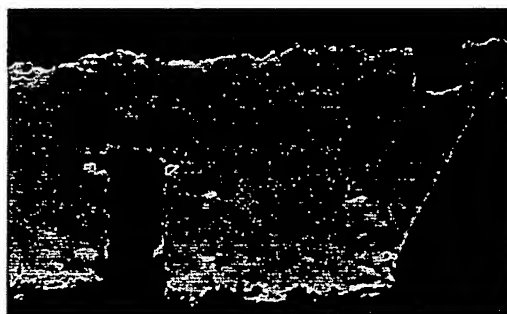


FIG.8

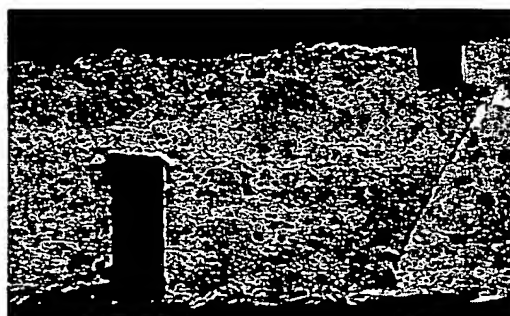


FIG.9



FIG.10



FIG.11

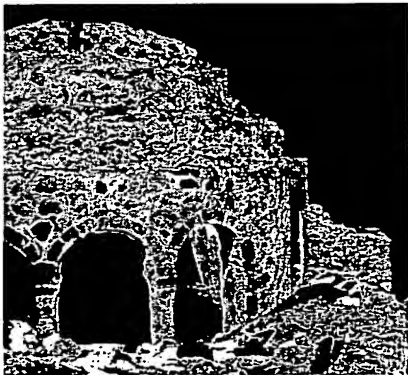


FIG.12



FIG.13A



FIG.13B